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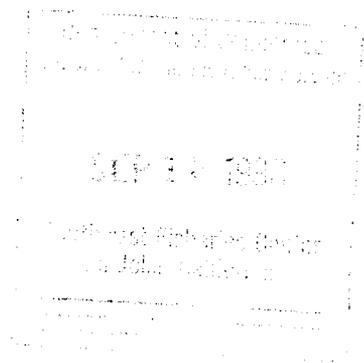
**THE U.S. SEA URCHIN INDUSTRY
AND
ITS MARKET IN TOKYO**

Chi H. Phu



NOAA-TM-NMFS-SWR-025

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southwest Region



NOAA Technical Memorandum NMFS

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Southwest Region
National Marine Fisheries Service, NOAA
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EXECUTIVE SUMMARY

The sea urchin fishery has been expanding in the United States, where the total landings exceeded 30,000 metric tons (mt) in 1988, surpassing that of the previous year by 30 percent. Most of the catches were made on the west coast, especially in California, which until 1987 accounted for about 90 percent of U.S. annual catches. In 1988, California's catch represented 73 percent of the total domestic catch, followed by Washington (15 percent), Maine (9 percent), Oregon (3 percent), and Alaska (less than one percent).

Because its large size allows economical processing, the red sea urchin (Strongylocentrotus franciscanus), found on the Pacific coast, continues to be the main target of U.S. commercial harvest on the west coast. The green sea urchin (S. droebachiensis) is principally caught on the east coast off Maine. Recently, however, catches of green sea urchin have increased significantly on the west coast. In Washington, green sea urchins made up approximately 12 percent of the state's total sea urchin catch in 1988 compared to 2 percent in 1986. In Alaska, the green sea urchin landings increased sixfold from under 14 to over 86 mt during the same period.

U.S. exports of sea urchins and sea urchin roe (roe) were worth \$68 million in 1989, compared with \$42 million in 1988. In 1989, Japan was the largest buyer (\$64.7 million), followed by Canada (\$3.5 million) and Europe (\$15 thousand).

Prices of whole sea urchins as well as roe are primarily determined by supply and demand, but quality, based on roe appearance, color, size, texture and freshness, is also important. In the Tokyo Central Wholesale Market, 1988 auction prices for fresh roe from the United States ranged from ¥200 to ¥6,500 (\$1.56 to \$50.78 at ¥128 = US\$1) per 225-260 g or 8-9 oz tray. Prices are generally unstable due, in part, to the increased flow of imports from several countries. U.S. exporters have difficulty competing in the Japanese market in summer, when supply of Japanese sea urchins is high.

Japan is by far the world's largest consumer and importer of roe. The United States and South Korea are the leading suppliers. In 1989, Japan's imports of sea urchins and roe were worth over \$137 million. Of this total, imports from the United States were worth \$67 million.

The import duty for sea urchins and roe, currently fixed at 10 percent, is higher than duty rates for most other seafood products imported into Japan under the General Agreement on Tariffs and Trade (GATT). Due to the nature of consigned shipments, import duties are paid by U.S. exporters. Should the duty be reduced or abolished, U.S. exporters would benefit and perhaps further development of the sea urchin fishery in

unexploited areas would be encouraged. Therefore, it is recommended that appropriate U.S. agencies seek the reduction or elimination of the Japanese import tariff on sea urchins and roe.

I. INTRODUCTION

The U.S. fishery for sea urchins was developed in the early 1970s in California with the goal of providing sea urchin roe (roe) for the large seafood market in Japan. Today, the sea urchin fishery is among the fastest growing fisheries in the United States. Total domestic landings have increased rapidly, from 3,454 metric tons (mt) in 1975 to 30,879 mt in 1988. Most of these landings were made in California, but other states have recently started to contribute substantial amounts. A small amount is exported to Canada and Europe, but most is shipped to Japan, which continues to be the world's leading importer of sea urchin products (U.S. Dept. of Commerce, 1982-90).

Prices paid in Japan for imported roe can vary widely, depending on quality and the current supply, especially of the Japanese domestic product. Most imported fresh roe is sold through auction at the Tokyo Central Wholesale Market in Japan. Although roe from California is known to receive the highest auction prices among imported roe, only a small amount of roe actually is sold at the top prices. The reason most often given for this is that the roe is of inferior "quality" compared to the domestic product. The product from the west coast, particularly from California, has had a fairly long history of acceptance in Japan. Recently, green sea urchins from the east coast have started to appear in the Japanese market. This species has an advantage in being similar to a Japanese species found in Hokkaido, and is beginning to gain recognition.

Auction prices of roe published in Japanese seafood trading newspapers are often misleading because only the range of the lowest and highest prices is given. Further, the prices are not stable, fluctuating primarily with changes in supply and demand. Since processing of roe is labor-intensive, costs are rather high, and the business may not be as profitable as some may think from glancing at the highest prices quoted for the product.

This report summarizes the development of the sea urchin fishery in the United States, and examines operational costs and prices. It also discusses Japan's sea urchin fishery and imports. Brief descriptions are also provided for various procedures used in packing, shipping, and distributing sea urchin products.

II. U.S. SEA URCHIN FISHERIES

The red sea urchin (*Strongylocentrotus franciscanus*) has been the main target of the U.S. sea urchin industry because of its abundance and because the species is large enough for economical harvesting and processing (Kato and Schroeter, 1985). In the United States, red sea urchins occur along the northeast Pacific coast from Alaska to the tip of Baja California. Green sea urchins (*S. droebachiensis*), smaller in size and more difficult to process, are also present in the northeast and

northwest Pacific as well as in the northwest Atlantic (Mottet, 1976). A third species, the purple sea urchin (*S. purpuratus*) is also abundant in west coast waters, but it is not commercially harvested at present because of its small size. Red and green sea urchins are available throughout most of the year, but most U.S. landings are made from September to March when Japanese domestic supplies are at their lowest level.

U.S. landings of sea urchins have grown rapidly since the discovery of the export potential of sea urchins to Japan in the early 1970s. Total annual catches, primarily from California, have increased from under 3,500 metric tons (mt) in 1975 to over 30,000 mt in 1988 (Figure 1 and Appendix A). The largest contributor to this prosperity has been the increased demand in Japan. The strong Japanese yen relative to the U.S. dollar also created economic incentives for U.S. investors to expand the geographical areas of sea urchin harvests and thereby increase the volume of exports (D. Parker, pers. comm.). In addition, the increased capability to meet Japanese quality standards has contributed to today's expanded industry.

California

California was the first state to export sea urchin roe (roe) to Japan and annual catches there have risen from 3,440 mt in 1975 to over 22,000 mt in 1988 (Figure 1 and Appendix A). Prior to 1987, California accounted for over 93 percent of total domestic catches except for 1976 when Washington's catch increased dramatically (Appendix A). However, California's share has gradually decreased to 88 percent in 1987 and 73 percent in 1988.

Prior to 1985, almost 100 percent of the annual state catches were made in southern California, with approximately 75 percent of the sea urchins being harvested from the Channel Islands. During 1982-84, El Niño, an oceanographic phenomenon characterized by increased sea temperatures, affected both the sea urchins and their source of food, giant kelp and other seaweed (Kato and Schroeter, 1985). These years saw lower landings of red sea urchins in southern California. Subsequently, annual catches in southern California recovered to 8,214 mt in 1985 and nearly 11,000 mt in 1986. Meanwhile, substantial catches were reported from Fort Bragg in northern California where 874 mt were harvested in 1985 compared to less than 30 mt in 1984 (Appendix B). Good weather, good demand, and a weakened dollar in recent years (Deweese, 1988) and fishing in unexploited areas (P. Kalvass, pers. comm.) contributed to the increased landings in the north. The northern California harvest has exceeded landings in the south during 1987 and 1988, with catches of 10,709 mt and 13,061 mt respectively. The catches in southern California were 10,226 mt in 1987 and 9,427 mt in 1988 (Appendix B).

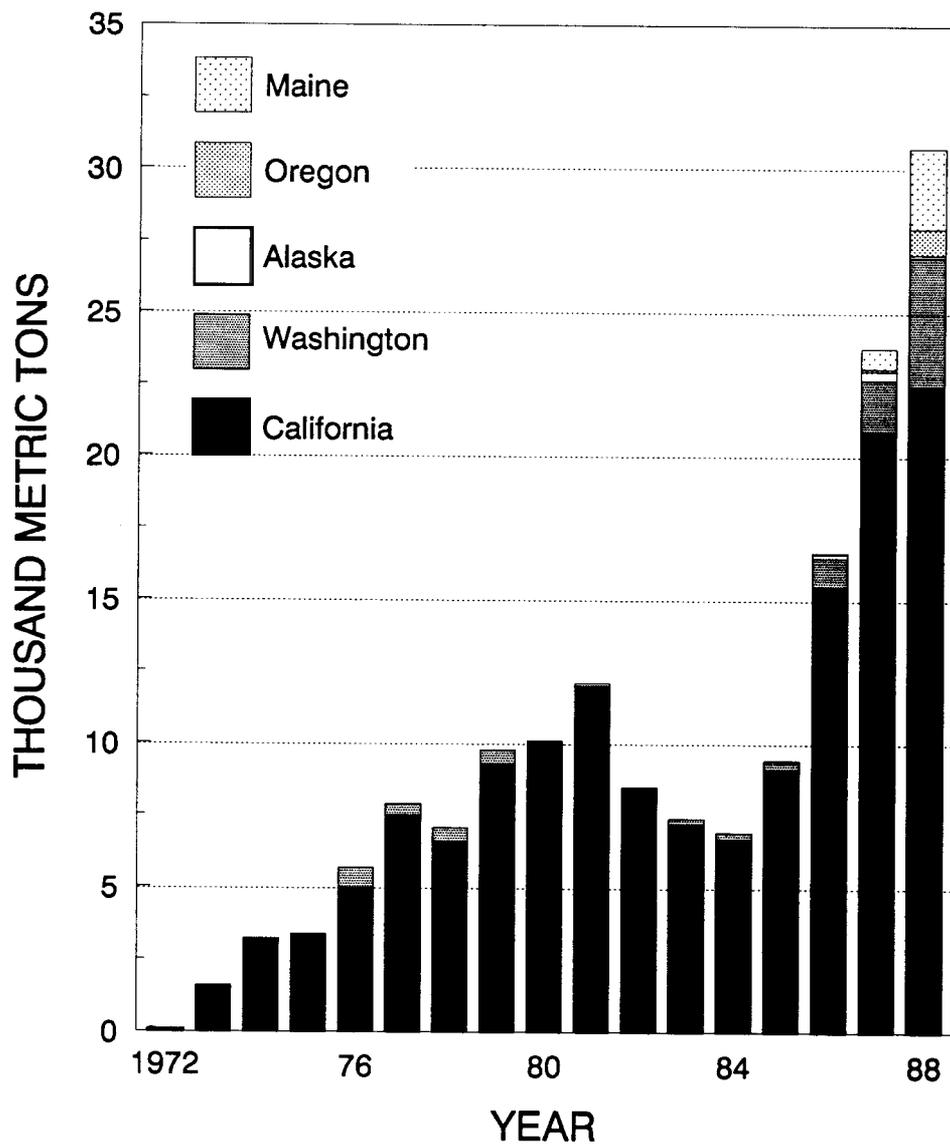


Figure 1. U.S. sea urchin landings by state, 1972-88.

Biologists of the California Department of Fish and Game (CDF&G) and members of the sea urchin industry are concerned about future stocks of red sea urchins if the present fishing rate persists. After much discussion among biologists and managers of the CDF&G, fishermen and processors, new regulations were recently enacted by the California Legislature to conserve the sea urchin resources. Effective March 8, 1989, the fishery was closed to new entrants until the number of diving permits was reduced to below 400; minimum harvestable sea urchin size was set at 7.6 cm (3") in shell diameter. In addition, when commercial landings of red sea urchins in any year exceed 4,545 tons (10 million pounds) in northern California or 8,182 mt (18 million pounds) in southern California, fishing during the following year would be closed coastwide during the second complete week of each month, from May to September (CDF&G).

Washington

In Washington, the sea urchin industry had also experienced periods of boom (1976-79 and 1985-88) and recession (1980-84). Between 1976-79, sea urchin landings averaged 509 mt per year compared to an average of only 12 mt in 1972-75. The increased catches resulted from fishing on previously unexploited beds, as well as from nonrestrictive regulations in force during that period (Bradbury, 1987). Landings took a downturn in 1980 when only 20 mt were recorded. This decrease was primarily due to the bad reputation created by a few local exporters who shipped low quality roe to Japan in 1979 (A. Bradbury, pers. comm.). Total harvest remained relatively low through 1984. Not until 1985 did the harvest volume recover, and since then total annual catches have risen consistently. In 1988, Washington Department of Fisheries (WDF) records showed a total catch of 4,592 mt (over 10 million pounds), 12 percent of which was green sea urchins (Figure 1 and Appendix A).

Populations of red and green sea urchins in Washington are moderately abundant along the Strait of Juan de Fuca. Most of the catch has been taken from the San Juan Islands and Port Angeles. In 1986, WDF began to post landings of red and green sea urchins separately because green sea urchin landings increased rapidly, from 16 mt in 1986 to 559 mt in 1988. The annual harvest for red sea urchin has done equally well, increasing from 951 mt to 4,032 mt during the same period. Fishery development efforts have targeted on the red sea urchin because its larger size makes it more profitable to harvest and process. Processing the smaller green sea urchin requires greater skill and more time, so green sea urchins are usually shipped whole to Canada and Japan (A. Bradbury; M. Stewart, pers. comms.).

In 1986, the WDF enacted regulations based on harvest area, size of sea urchin, and season. The objectives of the regulations are to protect the sea urchin resources and to insure the long-term supply of good quality sea urchins (Washington

Administrative Codes, WAC 220-52-073 and 220-52-075). Presently, 60 to 70 boats are licensed to harvest sea urchins in Washington. To remain in the fishery, a boat owner must land a minimum of 9.1 mt (20,000 lbs) of sea urchins within two years. The fishery is currently closed to new entrants until the number of boats is reduced to below 45 (A. Bradbury, pers. comm.).

Alaska

Commercial harvest of sea urchins did not start until 1980 in Alaska, where the cold waters are home to both red and green sea urchins (Durr, 1989). Although the annual catches are quite small compared to those of California, they have increased from less than one mt in 1980 to 87 mt in 1988 (Appendix A).

Ketchikan in the southeast and Kodiak in the western gulf are the two principal sea urchin harvesting areas in Alaska. Green sea urchins may be more abundant near Kodiak and red sea urchins near Ketchikan.

The Alaskan sea urchin fishery and export trade have not yet been fully developed (D. House, pers. comm.). Resources are plentiful, but harvesting is not attractive because most areas of high availability of sea urchins are remote. Processors too, are discouraged by high overhead costs and the long distance from most harvesting areas to processing plants. Also, air shipment to Japan is difficult and inconsistent (Freeman, 1987). Sea urchins must be processed and marketed quickly to maintain good quality. In addition, because most Alaskan divers are inexperienced, problems have occurred concerning roe quality. As the divers gain more experience in judging roe quality in the field, and processors learn better handling and processing techniques, the quality of the product should improve, and the Alaskan fishery will grow (D. House, pers. comm.).

While Alaskan populations of sea urchins are not threatened, regulations have been enacted to promote efficient use of the resources. The Alaska Department of Fish and Game (ADF&G) has limited the harvest size of red urchins to between 7.6 cm (3") and 11.4 cm (4½"). Harvest areas are also rotated. The catch of green sea urchins is not regulated at present. There are no restrictions on the number of fishermen allowed to enter into the fishery.

Oregon

The sea urchin fishery in Oregon was developed when catches declined in southern California in 1986. Annual landings started out at 25 mt in 1986 and increased to 885 mt by 1988. Most landings of red sea urchins have occurred at Port Orford, where 683 mt were landed in 1988. Port Orford has accounted for more than two-thirds of Oregon's total landings since the commercial fishery started. Coos Bay, with 91 mt in 1988, and Gold Beach,

with 82 mt in 1988 are two other landing ports (McCrae, 1989).

Overall, processors and harvesters are quite optimistic about the future of the Oregon sea urchin industry. Development of the sea urchin fishery has created jobs for local residents, and has increased Oregon's gross state product by several million dollars a year. However, recent high catches have caused some concern among local processors and harvesters who fear that reproductive capacity will be significantly reduced. Having observed the decreasing catch in southern California, regional businessmen have urged the Oregon Department of Fish and Wildlife (ODF&W) and local port commissions to manage the harvest of sea urchins to conserve existing resources (Schamehorn, 1989). The following regulations were implemented in January 1988: the number of fishermen was limited to 92 with non-transferable permits; sea urchins must be at least 7.6 cm (3") in shell diameter and taken from depths greater than 3 meters (10 feet); no more than two divers are allowed in the water at the same time off any one boat (McCrae, 1989).

Maine

On the east coast, Maine is the only state with a commercial fishery for sea urchins. Annual catches have surged rapidly, from 655 mt in 1987 to 2,828 mt in 1988 (Figure 1 and Appendix A). During the same period, the value of landings rose from \$236,391 to \$1,758,805 (National Marine Fisheries Service and Maine Department of Marine Resources). Roe of Maine green sea urchin is similar in size, texture, and color to that of Japanese products (S. Kato, pers. comm.).

Almost all green sea urchins harvested in Maine are shipped whole to Japan. The cost of air shipping whole sea urchins rather than roe is higher. But processing the small green sea urchin is costly as well as difficult, and processors run the risk of receiving lower net proceeds compared to shippers of whole sea urchins (Bernstein, 1989).

III. U.S. SEA URCHIN INDUSTRY

A. Exvessel prices

Prices for whole sea urchins in the United States are determined by market supply and demand as well as quality. During winter, the price of sea urchins reaches the highest point of the year for three reasons. First, the quality of sea urchin roe is often at its best. Second, this is a period of low production in Japan. Third, the demand in Japan is high during the holiday season (R. Juntz, K. Nishimoto, pers. comms.).

In California, exvessel prices of whole red sea urchins differ by catch areas. Sea urchins from the south are said to have better roe quality, and higher exvessel prices reflect this difference in quality (K. Nishimoto, pers. comm.). According to 1988 data collected by the CDF&G, the average landing price for red sea urchins in southern California, \$1.03/kg (\$0.47/lb), is about 56 percent more than the price in the north, \$0.66/kg (\$0.30/lb). Average landing prices of whole sea urchins in different states of the country in 1988 were as follows:

California:	Red sea urchins	=	\$0.81/kg
Washington:	Red sea urchins	=	\$0.63/kg
	Green sea urchins	=	\$1.02/kg
Oregon:	Red sea urchins	=	\$0.59/kg
Alaska:	Red sea urchins	=	N/A
	Green sea urchins	=	\$1.76/kg
Maine:	Green sea urchins	=	\$0.62/kg

These prices, which are derived from dividing annual total landing value by total landing volume, were obtained from individual state fishery departments.

Written contracts between wholesalers and fishermen seldom exist in the U.S. sea urchin fishery. Divers work independently or in groups, and usually have informal sales agreements with certain processors or brokers. Prices are generally based on roe recovery and quality as well as on market conditions in Japan. Local supply is affected mainly by weather conditions, as bad weather prevents divers from harvesting in unprotected fishing grounds (K. Nishimoto, J. Wilson, pers. comms.).

B. Processor's and Exporter's Costs

Total cost of processing sea urchins is high due to its labor-intensive procedures. These include: cracking open the shell, removing the roe, cleaning, sorting, and packing (Kato & Schroeter, 1985). All these steps are time-consuming because careful handling is required to maintain roe quality. It is difficult to calculate exact costs because many of the expenditures are variable. However, total cost is relatively higher for smaller sea urchins because for the same amount of work, total output (roe) is less. The following are common expenses incurred by processors, who export their products to Japan:

- Rent
- Insurance
- Labor
- Utilities
- Telephone, telex, and facsimile
- Whole sea urchins
- Processing and packing materials
- Landing tax
- Commission fees to broker
- Transportation (trucking and airfreight)
- Freight forwarders
- Handling fees (bank service)
- Import duty (in case of consignment sale)
- Others (sewage, sea urchin waste disposal, etc.)

Presently, sea urchins and roe are shipped to Japan from the United States primarily on Japan Air Lines and Korean Air Lines. Airfreight rates given in Table 1 are based on the former. The rates may vary around 5 percent for the latter. Airfreight rates from the United States to Osaka, Japan, are 3 to 10 percent higher.

Table 1. Airfreight rates, in cost per kilogram, for shipping sea urchins and sea urchin roe from the United States to Narita, Japan

U.S. Shipping Point	Shipment weights			
	under 45 kg	45 - 100 kg	101 - 300 kg	over 300 kg
West Coast	\$6.90	\$5.25	\$4.63	\$2.43
Boston and New York	8.22	6.24	5.51	3.09
Anchorage, Alaska	6.31	4.81	4.23	1.76

Source: Japan Air Lines, Los Angeles, California.

C. Sales Arrangements

Generally, sea urchin sales are conducted through either consignment sale or direct sale. With that "consignment sale" method, the importer is responsible for clearing the shipment through Japan's customs, then delivering it to the auction market. Profit or loss for exporters is determined by the total revenue less all costs in the United States and in Japan. Costs in Japan include customs broker fee, transportation, and sales commission. Importers receive a commission from exporters for handling the shipment on consignment (D. Showalter, K. Nishimoto, pers. comms.). In "direct sale", a fixed price is set between exporters and importers. The exporter's responsibility ends after the shipment is aboard the carrier.

D. Packing, Shipping, and Distribution

Packing

Proper packing of fresh sea urchin roe is vital if the product is to receive high prices. Appearance is important to Japanese consumers especially in sushi restaurants where varieties of seafood are displayed. Exporters are aware of this and strive to ensure delivery of their products in optimal condition.

During processing, some skeins of roe are inevitably broken and lower quality roe (off-color, too large, etc.) are always found. Workers neatly arrange fresh roe by similar color and size in wooden trays (Kramer & Nordin, 1979; Kato & Schroeter, 1985). Usually, a stack of 8 to 12 trays, each holding 225-260 g (8-9 oz) of roe and with a wooden cover on the top tray, are tied together with string. Forty-two of these trays are then placed in an insulated shipping box along with two (in the winter) to four (in the summer) packs of gel ice to assure a cool temperature. Each pack of gel ice weighs 0.68 kg (1.5 lb), and gross weight per shipping box is approximately 15-17 kg or 33-38 lb (H. Nakabayashi, pers. comm.).

Roe is also packed in bulk-pack foam trays. This is less costly in terms of packing materials, labor, and airfreight costs, but the roe need to be repacked in wooden trays in Japan (K. Nishimoto, pers. comm.).

Shipping

Since fresh roe is highly perishable, transporting time is critical for maintaining quality. Airfreight arrangements are made soon after sea urchins are received by processing plants. In southern California, exporters normally deliver their product to air cargo offices at Los Angeles International Airport before 10:30 P.M. This allows sufficient time for cargo to be shipped on the late night cargo flight to Tokyo, leaving between 1:00 A.M. and 2:00 A.M. This flight stops for two hours in Anchorage, Alaska for refueling, then resumes the trip to Tokyo. Occasionally, fresh roe is shipped on passenger flights (T. Oiwa, pers. comm.).

Upon arrival in Japan around 7:00 A.M., cargo is unloaded within 30 minutes to an hour. One to two hours are needed for clearing customs. Usually, it takes 6-7 hours after arrival before the cargo is released to truckers (T. Oiwa, pers. comm.). Thus, the products will not be available for auction sale on the day of arrival, but rather on the following trading day.

Distribution

Fresh roe shipped to Tokyo from the United States is sold through auctions at the Tokyo Central Wholesale Market and other wholesale markets directly by importers, exporters, or through import agents. It is also sold to supermarket chains without going through wholesale auctions (T. Asakawa, pers. comm.).

Whole sea urchins are usually sold by importers to processors in northern Japan for processing (T. Asakawa, pers. comm.). The tray-packed roe is then shipped to auction markets in Tokyo or elsewhere, or sold to local wholesalers (K. Nishimoto, pers. comm.).

Frozen or salted roe imported into Japan is usually sold directly to processors, who produce steamed, canned, and preserved roe, as well as other product forms (T. Asakawa, pers. comm.).

E. U.S. Exports

The strong demand for sea urchin roe in Japan was the principal impetus for development of the fishery in the United States. In 1989, the United States exported \$68.3 million worth of sea urchins and roe, an increase of 62 percent compared with 1988. Export quantity also rose to 5,575 metric tons (mt), more than double the 1988 quantity. Of this total, 90 percent was exported to Japan, 10 percent to Canada, and less than one percent to other countries (Table 2). Until 1985, U.S. statistics of sea urchin exports referred only to roe, (fresh, frozen, and salted). Since 1985, however, these statistics have been confounded by the inclusion of whole sea urchins, which weigh some 10-20 times more than roe.

Table 2. U.S. exports of sea urchins and sea urchin roe, 1981-89.

Year	Japan		Canada		Europe		Total*	
	Q	V	Q	V	Q	V	Q	V
1981	65	910	0	0	0	0	76	926
1982	29	310	3	14	0	0	32	327
1983	28	411	--	1	--	2	28	414
1984	89	895	3	13	0	0	92	908
1985	354	5,899	3	55	0	0	358	5,974
1986	658	12,420	5	28	42	470	705	12,921
1987	1,598	28,228	3	9	3	15	1,605	28,258
1988	2,421	39,942	148	1,927	16	195	2,586	42,089
1989	4,990	64,682	582	3,530	--	15	5,575	68,264

Note: 1981-84 data are for sea urchin roe only.

* Total may include other countries not listed. Q = Metric tons; V = Thousands of dollars; -- = Less than one metric ton.

Source: U.S. Dept. of Commerce, Bureau of the Census, 1982-90.

California, by far the leading exporter, shipped mostly roe to Japan. Most red sea urchins harvested in Washington and Oregon also were exported to Japan as roe. Part of the catches was shipped whole to Canada, where the sea urchins are processed and reexported to Japan (A. Bradbury, J. McCrae, pers. comms.). But green sea urchins from Maine, Washington, and Alaska were primarily sent whole to Japan, where the roe is extracted and packed.

F. Wholesale Prices in Tokyo

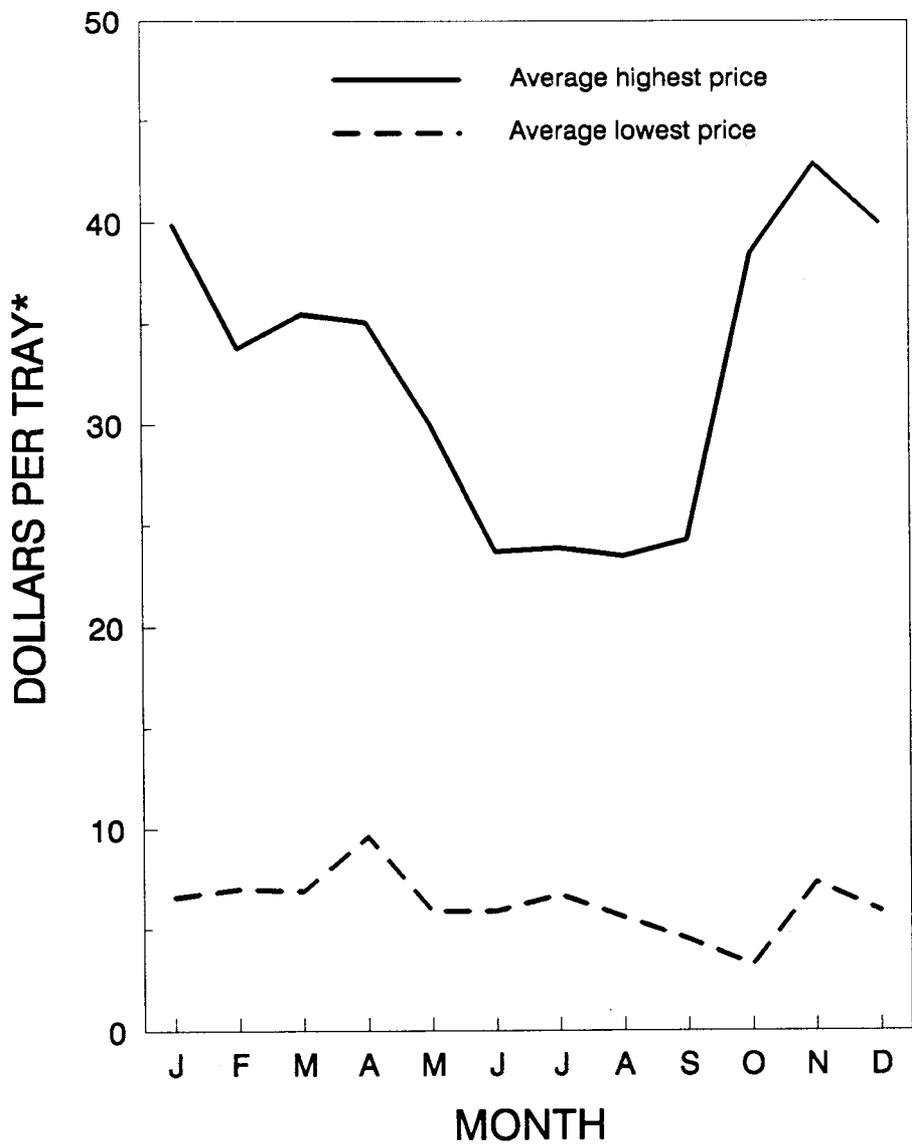
Most imported fresh sea urchin roe (roe) is sold by auction at the Tokyo Central Wholesale Market. The prices paid depend primarily on roe quality and the availability of Japanese roe. Highest prices are paid for roe which is bright yellow or orange, firm and smooth (not grainy), unbroken, and packed neatly in trays (Pacific Fishing, 1980).

Prices reported by the Japanese daily seafood trading newspaper, The Nikkan-Shokuryo Shimbun, give the range in daily auction prices. Figure 2 shows the monthly average prices derived from 16 to 20 daily auction prices for roe imported from the United States in 1988. Tables showing daily price ranges of U.S. roe and the supply (Japanese domestic product and imports) are given in Appendix C. It should be stressed that only a small fraction of U.S. roe exported to Japan receives the highest auction price (K. Nishimoto, pers. comm.). The line representing the average of daily highest prices by month in Figure 2 can be divided into three periods to indicate seasonal price trends during the year. Based on the price quotations, the highest price period for U.S. roe occurs from October through January. The peak prices occurred in November, averaging ¥5,360 (\$42.88 at ¥125 = US\$1) per tray. These high prices reflect the low availability of Japanese roe as the Japanese sea urchin fishery is relatively inactive in winter (Figure 3).

A medium price period runs from February to May, during which time the highest auction prices were moderate, averaging ¥4,276 (\$33.67 at ¥127 = US\$1) per tray. This is the period when the Japanese domestic supply begins to increase (Figure 3; Takagi, 1985).

The lowest price period is from June to September. The price was lowest in June averaging ¥2,968 (\$23.74 at ¥125 = US\$1) per tray. High availability of Japanese sea urchins causes lower prices for the U.S. product (Figure 3).

Auction prices at the low end of the range (Figure 2) are usually for low quality roe, and are not necessarily related to supply and demand.



* 225-260 g (8-9 oz).

Note: Monthly yen/dollar exchange rates are: J-126, F-129, M-129, A-126, M-125, J-125, J-131, A-133, S-134, O-133, N-125 and D-122.

Figure 2. Monthly average highest and lowest prices in dollars per tray paid in 1988 for U.S. sea urchin roe at the Tokyo Central Wholesale Market.

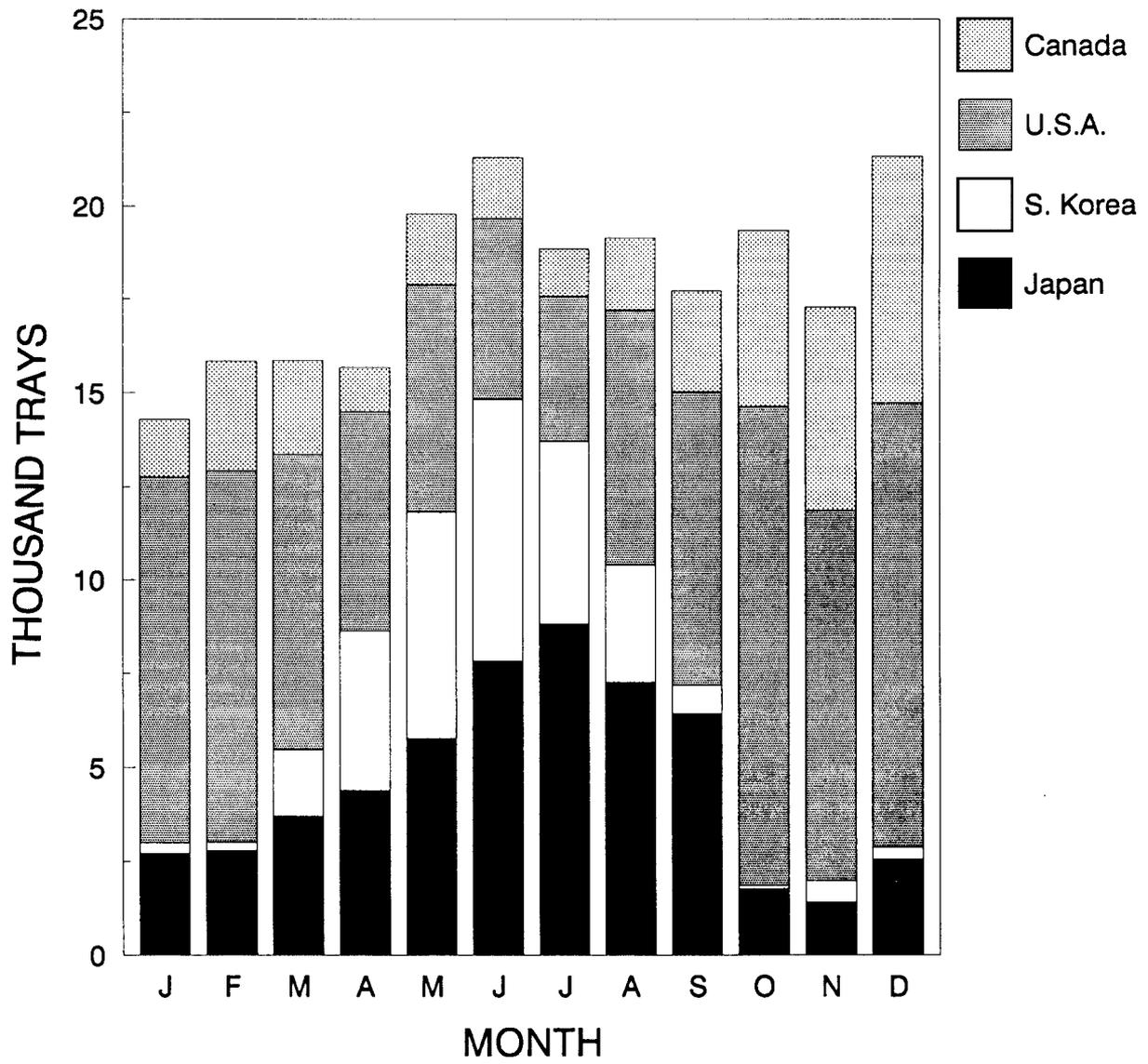


Figure 3. Average daily number of trays of sea urchin roe traded in the Tokyo Central Wholesale Market and the country of origin, 1988.

IV. JAPAN'S SEA URCHIN FISHERIES

Japan was the world's largest harvester of sea urchins until 1984. From 1985 to 1987, landings in Chile have exceeded Japanese landings (FAO, vol. 42, 48, 54, & 64). From 1975 through 1987, annual Japanese landings fluctuated between 22,000 and 27,000 mt (Table 3).

Table 3. Japan's sea urchin landings, 1975-87 (metric tons).

Year	Landings	Year	Landings	Year	Landings
1975	22,482	1980	24,158	1985	22,745
1976	23,085	1981	23,984	1986	23,072
1977	26,898	1982	25,975	1987	22,760
1978	25,930	1983	25,254		
1979	26,500	1984	23,962		

Sources: FAO, Yearbook of Fishery Statistics, Catches and Landings, vols. 42, 48, 54 and 64.

At least eight species of sea urchin are commercially harvested in Japan. Three major species found in southern Japanese waters are: Hemicentrotus pulcherrimus, Pseudocentrotus depressus, and Anthocidaris crassispinata. Five minor species include Strongylocentrotus intermedius, which is principally found on the coasts of Hokkaido; S. nudus Tripneustes gratilla, Mespilia globulus, and Temnopleurus toreumaticus are mostly found off southern Japan. Of these eight species, five are harvested mainly from June to August. But H. pulcherrimus is taken in March and April, and P. depressus and S. nudus, from September to November (Takagi, 1985). The different peak fishing seasons in Japan (summer) and North America (winter) have benefited U.S. exporters in marketing sea urchins (Kramer & Nordin, 1979).

V. JAPAN'S IMPORTS

To fill the high demand for sea urchin roe, Japan increased imports from 1,684 mt valued at \$10.3 million in 1975 to 4,845 mt at \$136.9 million in 1989. From 1984 to 1989, Japan's imports from the United States have more than quadrupled in volume and the import value in yen has more than tripled. In terms of dollars, however, the import value in 1989 was more than six times the amount in 1984 (Table 4 and Figure 4). The difference resulted from the depreciation of the U.S. dollar which occurred after 1985. Table 4 also shows a sharp increase in Japan's imports from the United States starting in 1986, exceeding a thousand metric tons for four consecutive years. This increase was due to two factors. One was the sharp increase in catches of red sea urchins in northern California, and the other was the development of the green sea urchin fisheries in Maine, Alaska,

and Washington. The latter are imported whole rather than as roe, and the statistics do not differentiate between the two product forms. Thus, the increased imports from the United States are not as substantial as these statistics seem to indicate.

Table 4. Japan's imports of sea urchins and sea urchin roe from the United States and the world, 1975-89 (metric tons and millions of dollars).

Year	Japan's Total Imports		Imports from the United States		Yen/Dollar Exchange Rate
	Volume	Value	Volume	Value	
1975	1,684	10.3	232	2.5	297
1976	1,874	14.4	357	4.1	297
1977	2,458	20.5	511	5.9	269
1978	2,315	23.9	486	6.3	210
1979	2,502	30.5	759	11.1	219
1980	2,207	28.4	590	10.0	227
1981	2,426	34.1	637	12.1	221
1982	2,397	32.3	497	9.4	249
1983	2,321	34.4	411	8.7	238
1984	2,636	43.1	539	10.5	238
1985	2,857	45.5	888	15.9	239
1986	3,601	74.3	1,243	26.5	169
1987	3,696	99.3	1,564	40.2	145
1988	4,651	140.5	1,750	53.7	128
1989♦	4,845	136.9	2,301	67.0	138

♦ Preliminary.

Sources: Japanese Marine Products Importers Association, 1976-89.
National Marine Fisheries Service, 1989-90.
International Monetary Fund, 1985 and 1989.
Suisan Keizai Shimbun, February 22, 1990.

The United States and South Korea are the leading suppliers of live or fresh products (Table 5). Table 5 also shows increased imports of live or fresh product forms from South Korea during the summer, while imports from the United States are primarily from fall through winter. The United States is also the largest supplier of frozen roe. South and North Korea provide most of the dried or salted product.

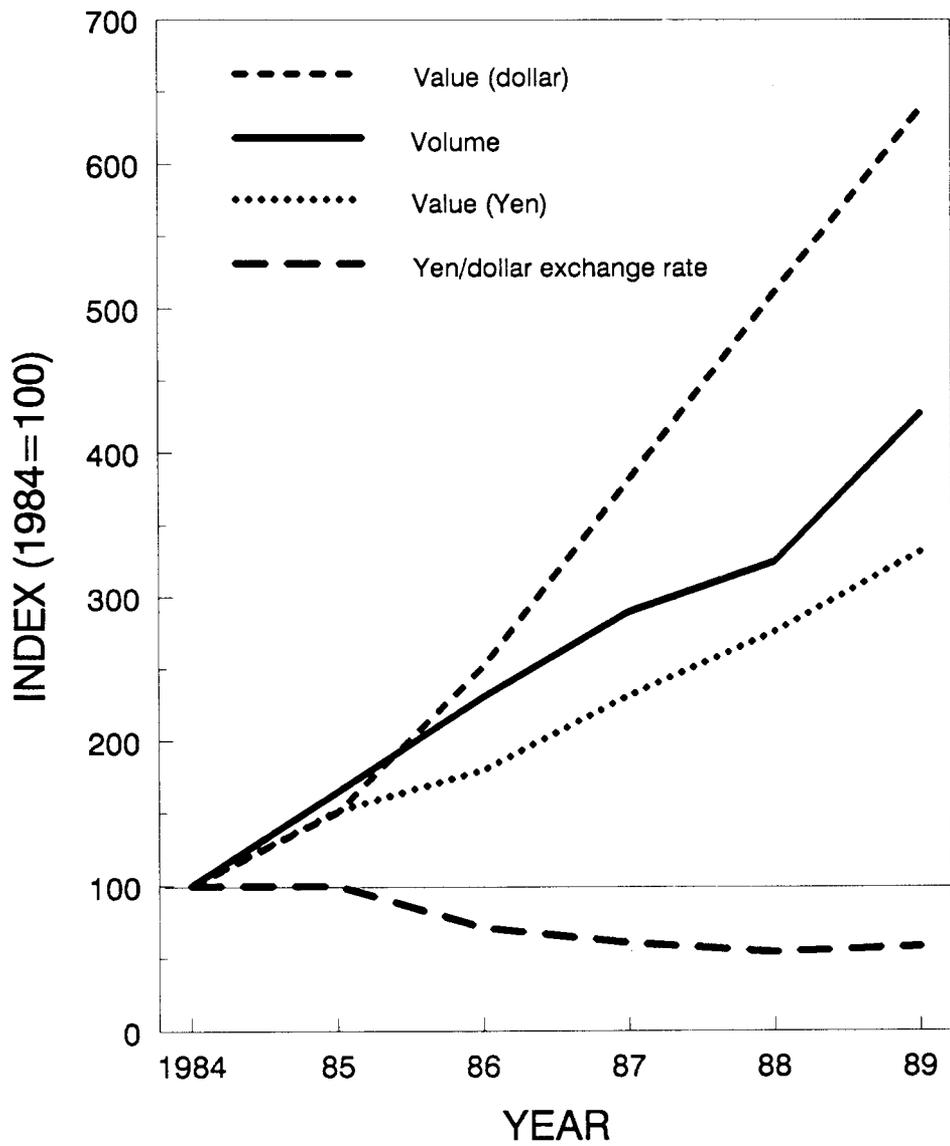


Figure 4. Index of Japan's imports of sea urchins and sea urchin roe from the United States, 1984-89.

Table 5. Japan's imports of sea urchins and sea urchin roe by product form and major countries, 1988 (metric tons).

Product form & Countries	Jan.	Feb.	Mar.	Apr.	May	June	July
Live/Fresh							
South Korea	56	32	56	66	91	108	80
U.S.A.	122	109	88	82	84	66	84
Canada	38	30	24	14	25	15	14
Total*	222	175	179	186	209	193	186
Frozen							
U.S.A.	17	20	14	21	3	10	22
Chile	29	14	11	N/A	N/A	14	31
Total*	59	38	31	28	10	31	53
Dried/Salted							
South Korea	70	25	75	9	19	5	6
North Korea	14	26	5	21	12	24	55
China	18	17	N/A	10	N/A	19	6
Total*	110	76	96	55	43	73	84

Product form & Countries	Aug.	Sept.	Oct.	Nov.	Dec.	January to December
Live/Fresh						
South Korea	92	60	62	67	78	848
U.S.A.	96	101	193	109	171	1,305
Canada	19	29	61	63	73	406
Total*	209	192	318	244	330	2,643
Frozen						
U.S.A.	47	80	59	74	65	432
Chile	7	16	5	33	17	179
Total*	84	105	79	129	112	760
Dried/Salted						
South Korea	4	7	22	72	132	444
North Korea	79	30	84	20	60	430
China	8	19	41	29	44	210
Total*	101	64	158	136	251	1,248

* Total also includes other countries not listed.
N/A - not available.

Sources: Japan Marine Products Importers Association, 1989.
Japan Tariff Association, 1989.
National Marine Fisheries Service, 1988-89.

VI. CONCLUSIONS

The sea urchin fishery in the United States has expanded significantly in recent years. Overall, growth should continue in the future, probably at a slower rate, as new fishing grounds are developed. Regulations have been instituted in several states to conserve sea urchin resources. These include harvest restrictions based on sea urchin size, as well as seasonal and areal closures. In addition, the number of licensed harvesters has been regulated in some states.

U.S. exports of sea urchins and sea urchin roe have risen primarily due to increased demand in Japan. The strength of the yen against the dollar has made U.S. products more competitive in the Japanese import market. If the demand and monetary conditions remain favorable, U.S. exports should continue to increase, provided that processors furnish good quality products, which is the key to success in the demanding Japanese seafood market.

Fresh sea urchin roe is the best product form to export to Japan. Despite the high cost of processing and maintaining roe quality over long distances, the high prices paid for fresh roe make processing profitable. Auction prices for fresh roe have been as high as ¥6,500 (\$50.78 at US\$1 = ¥128) per tray (225-260 g or 8-9 oz) in winter, but average prices for the U.S. product range between ¥2,000 (\$15.63) and ¥3,000 (\$23.44). If the sea urchins are small, like green and purple sea urchins, it is probably more cost effective to export them whole rather than processed.

The import duty of 10 percent for sea urchins and roe is higher than duty rates for most other seafood products imported into Japan. Due to the nature of consigned shipments, import duties are paid by U.S. exporters. Should the duty be reduced or abolished, U.S. exporters would benefit and perhaps further development in the sea urchin fishery in unexploited areas would be encouraged.

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Appendix A. U.S. sea urchin landings by state, 1972-88
(metric tons)

Year	Alaska	California	Washington	Oregon	Maine	Total
1972	---	34.8	1.1	---	---	35.9
1973	---	1,634.0	6.7	---	---	1,640.7
1974	---	3,300.8	26.1	---	---	3,256.9
1975	---	3,439.6	14.1	---	---	3,453.7
1976	---	5,048.4	702.0	---	---	5,750.4
1977	---	7,516.5	410.2	---	---	7,926.7
1978	---	6,558.0	467.2	---	---	7,025.2
1979	---	9,344.5	455.5	---	---	9,800.0
1980	0.4	10,076.0	19.7	---	---	10,096.1
1981	0.7	12,035.2	122.0	---	---	12,157.9
1982	0.3	8,440.1	92.0	---	---	8,532.4
1983	0.9	7,184.1	187.4	---	---	7,372.4
1984	27.9	6,679.2	187.3	---	---	6,894.4
1985	63.4	9,088.6	291.8	---	---	9,443.8
1986	143.3	15,514.0	966.5	25.4	---	16,649.2
1987	344.3	20,936.0	1,774.2	92.2	654.6	23,801.3
1988	86.6	22,487.6	4,591.8	885.1	2,828.2	30,879.3

Sources: Alaska Department of Fish and Game.
California Department of Fish and Game.
Washington Department of Fisheries.
Oregon Department of Fish and Wildlife.
National Marine Fisheries Service.
Maine Department of Marine Resources.

Appendix B. Sea urchin landings in northern and southern California, 1972-88. (metric tons)

Year	Northern*	Southern**	Total
1972	---	34.7	34.8
1973	4.9	1,629.1	1,634.0
1974	23.4	3,207.5	3,230.9
1975	1.4	3,438.2	3,439.6
1976	43.1	5,005.3	5,048.4
1977	175.5	7,341.0	7,516.5
1978	23.5	6,534.5	6,558.0
1979	107.4	9,237.6	9,345.0
1980	95.1	9,980.9	10,076.0
1981	105.8	11,929.4	12,035.2
1982	22.9	8,417.2	8,440.1
1983	17.4	7,166.7	7,184.1
1984	28.8	6,650.4	6,679.2
1985	874.4	8,214.2	9,088.6
1986	4,624.7	10,889.2	15,514.0
1987	10,709.2	10,226.4	20,935.6
1988	13,060.5	9,427.1	22,487.6

* Includes Eureka, San Francisco and Monterey districts.

** Includes Santa Barbara, Los Angeles and San Diego districts.

--- = Less than one metric ton.

Source: California Department of Fish and Game.

APPENDIX C. Daily number of trays of sea urchin roe traded and the highest and lowest wholesale prices paid for U.S. sea urchin roe at the Tokyo Central Wholesale Market.

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
1/6	1,134	0	11,531	4,825	850	6,500
1/7	1,710	0	16,755	3,754	500	6,000
1/8	2,755	0	16,665	2,134	500	5,800
1/11	1,381	0	17,747	4,052	500	5,000
1/12	1,116	27	8,225	2,700	800	4,700
1/13	3,195	0	6,713	2,262	800	5,200
1/14	4,865	119	12,109	0	900	5,000
1/18	3,992	130	10,712	0	1,000	5,200
1/19	4,067	390	6,703	0	900	5,000
1/20	2,635	1,771	3,174	0	400	4,500
1/21	2,607	369	2,080	0	400	4,300
1/25	5,191	1,512	11,753	0	1,400	4,000
1/26	2,327	130	7,792	0	1,200	4,800
1/27	1,594	130	4,392	0	1,400	4,000
1/28	2,401	0	11,781	2,460	800	5,200
1/29	2,635	0	11,278	2,404	1,000	5,200
Avg.	2,725	286	9,963	1,537	834	5,025

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
2/1	4,504	0	22,518	5,076	550	4,200
2/2	3,844	0	9,758	4,497	650	4,000
2/3	1,534	390	6,157	0	700	3,600
2/4	1,056	0	9,554	1,624	750	3,700
2/5	2,858	910	11,560	3,443	700	4,000
2/8	4,308	0	23,241	3,691	800	4,000
2/9	1,762	187	11,555	0	700	4,300
2/10	3,944	0	12,301	4,777	750	4,700
2/15	4,174	749	9,536	4,670	800	4,800
2/16	1,707	619	5,850	2,961	500	4,700
2/17	1,382	130	3,809	2,613	1,300	4,900
2/18	2,518	581	3,867	2,540	1,400	4,600
2/22	3,700	0	3,116	4,754	1,200	4,500
2/23	3,388	130	4,553	3,144	900	4,200
2/24	2,413	0	2,196	2,943	2,200	4,300
2/25	2,185	0	6,194	1,780	600	4,800
2/29	2,500	0	22,833	828	800	4,800
Avg.	2,810	217	9,918	2,902	900	4,359

APPENDIX C (continued).

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
3/1	1,477	896	14,569	1,510	900	4,000
3/2	1,973	260	7,175	600	1,000	4,500
3/3	1,809	2,707	6,298	560	1,100	4,800
3/7	4,333	260	6,829	5,430	800	5,000
3/8	4,103	0	5,697	1,320	600	4,500
3/9	5,260	899	1,107	2,206	1,400	4,000
3/10	4,194	349	5,526	900	1,000	4,800
3/14	4,340	5,112	5,641	2,446	900	4,500
3/15	4,186	2,924	5,671	3,504	900	4,600
3/16	3,938	942	1,265	600	2,300	4,700
3/18	4,599	2,468	12,293	4,955	950	4,600
3/22	6,825	910	23,133	4,224	650	4,300
3/23	2,612	1,375	8,108	3,658	500	4,500
3/24	2,645	107	13,113	2,724	500	4,800
3/25	3,105	468	11,315	1,920	600	5,000
3/28	4,534	5,007	9,462	2,316	800	5,000
3/29	4,268	5,601	5,514	1,564	600	4,400
3/30	3,254	2,101	4,384	690	500	4,800
3/31	3,126	1,020	2,898	6,194	800	4,300
Avg.	3,715	1,758	7,895	2,491	884	4,584

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
4/1	4,427	3,600	3,142	2,726	1,300	4,500
4/5	4,467	3,961	4,251	2,578	2,300	5,200
4/6	6,099	3,576	1,304	458	1,500	4,800
4/7	5,037	1,865	6,527	587	1,000	5,200
4/8	5,156	16,090	7,014	216	1,400	5,200
4/11	2,973	3,770	10,039	0	1,300	4,300
4/12	2,707	3,748	4,283	55	1,600	4,600
4/13	4,042	3,974	1,392	0	1,500	5,000
4/14	2,724	6,743	9,010	0	1,300	4,800
4/15	2,807	1,585	10,738	3,288	700	4,800
4/18	5,012	4,239	10,624	1,680	500	4,000
4/19	4,698	1,481	6,516	3,014	600	3,700
4/20	4,475	0	4,263	2,150	600	3,300
4/21	4,270	3,492	2,476	1,140	650	3,400
4/22	5,615	2,942	3,240	996	500	3,800
4/25	5,644	3,882	5,202	0	1,700	4,400
4/26	3,779	4,921	4,644	270	1,500	4,500
4/27	4,343	5,296	695	0	1,800	4,000
4/28	5,282	5,297	15,173	2,856	1,300	4,500
Avg.	4,398	4,235	5,870	1,159	1,213	4,421

APPENDIX C (continued).

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
5/2	6,860	5,651	21,707	5,929	500	3,800
5/6	4,202	3,536	11,293	1,984	900	4,500
5/9	7,024	3,193	2,129	1,868	1,200	4,800
5/10	5,493	2,654	1,435	0	1,200	3,500
5/11	4,433	3,000	587	0	1,200	2,000
5/12	3,488	4,074	5,990	0	800	4,000
5/13	4,283	7,696	7,584	2,014	700	4,500
5/16	4,683	9,435	7,710	3,037	900	4,500
5/17	5,409	9,262	5,008	3,470	700	3,700
5/18	6,750	5,900	1,734	1,360	800	3,300
5/19	8,274	7,320	5,450	1,008	500	3,500
5/20	8,963	9,231	8,542	3,000	400	3,000
5/23	12,535	9,577	4,120	708	700	3,400
5/24	3,308	7,032	3,842	630	800	3,500
5/25	3,899	4,474	1,704	3,141	850	3,800
5/26	3,705	1,614	6,542	2,772	300	3,800
5/27	3,691	3,517	4,803	1,991	400	4,300
5/30	6,931	15,046	7,752	3,106	700	4,000
5/31	5,544	3,148	7,146	360	500	3,300
Avg.	5,762	6,072	6,057	1,915	739	3,747

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
6/1	4,938	7,325	3,009	2,748	600	3,000
6/2	5,565	9,164	3,717	2,844	400	3,300
6/3	6,742	2,963	4,733	1,727	300	3,300
6/6	7,154	10,291	6,029	540	750	4,000
6/7	3,776	7,845	4,905	0	500	3,300
6/8	5,233	6,794	2,225	506	1,100	3,700
6/9	5,933	12,669	1,965	444	800	3,800
6/10	7,579	7,939	1,621	1,783	1,400	4,000
6/13	10,821	14,695	930	540	1,700	2,200
6/14	5,456	0	11,005	2,640	200	1,800
6/16	9,318	11,017	168	1,140	1,800	2,100
6/20	11,085	5,651	10,004	3,395	600	2,800
6/21	8,497	4,355	9,299	1,752	600	2,800
6/23	13,265	11,654	7,733	3,461	400	2,800
6/24	8,550	6,457	5,280	2,484	500	2,500
6/27	12,990	5,793	7,824	1,368	400	2,800
6/28	6,880	1,602	5,387	1,788	600	2,700
6/29	6,623	2,244	2,684	1,578	600	2,500
6/30	7,921	4,496	3,581	239	700	3,000
Avg.	7,829	6,998	4,847	1,630	734	2,968

APPENDIX C (continued).

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
7/1	8,649	3,467	4,441	0	1,050	3,200
7/4	9,232	7,674	2,874	2,328	1,100	3,000
7/5	7,545	6,174	2,417	1,167	1,250	3,000
7/6	7,574	7,005	1,070	0	2,600	3,200
7/8	7,539	6,847	3,182	0	1,200	3,300
7/11	8,793	10,506	0	1,620	1,300	3,500
7/12	8,111	10,562	0	636	1,400	3,800
7/13	8,541	9,574	0	0	700	3,000
7/14	8,485	7,212	1,970	539	300	3,200
7/18	8,908	3,664	11,603	2,940	800	3,000
7/19	8,190	2,679	7,288	1,845	800	3,000
7/20	6,293	1,300	1,711	2,350	300	3,000
7/21	8,053	1,292	6,902	1,259	700	3,000
7/22	10,259	1,536	7,175	1,980	1,200	3,000
7/25	11,573	1,630	6,614	2,460	700	3,000
7/28	13,601	1,940	4,631	2,097	1,200	3,000
7/29	8,593	126	3,969	420	1,300	3,000
Avg.	8,820	4,893	3,873	1,273	872	3,129

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
8/1	12,504	6,653	8,649	2,520	700	2,800
8/3	5,957	6,658	1,072	1,260	1,250	2,600
8/4	5,428	5,183	7,117	1,068	700	3,000
8/5	8,304	3,187	4,746	3,187	650	3,000
8/8	11,712	6,350	7,874	3,048	600	2,800
8/9	11,406	2,106	5,460	1,367	500	3,000
8/10	8,579	5,036	252	1,918	1,000	1,300
8/12	8,991	2,434	7,472	1,140	700	2,900
8/19	5,252	0	5,772	2,878	1,000	5,000
8/23	5,650	962	6,195	1,920	400	3,000
8/24	4,281	1,603	2,463	1,140	600	2,800
8/25	5,503	2,381	8,960	719	400	3,600
8/26	6,192	4,398	8,243	1,607	450	3,400
8/29	7,169	572	12,101	3,108	600	3,800
8/30	5,933	1,359	6,721	2,940	400	3,500
8/31	3,410	1,378	2,054	1,440	2,500	3,500
Avg.	7,267	3,141	5,947	1,954	742	3,125

APPENDIX C (continued).

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
9/2	3,983	709	8,241	4,103	200	4,300
9/5	7,721	709	12,285	3,059	500	4,500
9/7	9,563	0	4,116	2,399	400	2,500
9/8	6,485	0	7,189	2,687	1,000	1,800
9/9	6,863	0	8,574	2,028	400	2,200
9/12	11,201	2,451	1,891	3,708	400	2,200
9/13	7,379	4,195	291	1,932	2,800	3,000
9/14	10,806	3,458	1,722	0	900	1,800
9/16	8,733	650	7,653	1,932	400	3,800
9/19	6,085	306	19,173	2,700	450	3,300
9/20	4,088	301	10,578	1,134	300	3,500
9/21	4,659	130	2,738	7,709	500	3,300
9/26	7,684	0	12,418	4,257	300	4,500
9/27	4,468	124	6,670	1,431	500	4,000
9/28	3,480	0	1,384	1,769	500	3,500
9/29	2,854	0	14,391	2,106	400	3,600
9/30	3,163	0	13,943	2,921	300	3,500
Avg.	6,424	767	7,839	2,867	603	3,253

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
10/3	3,105	0	15,598	5,172	500	4,500
10/4	3,010	0	13,394	3,186	400	4,500
10/5	3,038	0	7,085	3,194	400	4,800
10/6	1,831	0	10,713	2,477	300	5,000
10/7	2,732	0	11,885	4,176	500	5,100
10/11	2,660	0	13,124	3,768	500	5,500
10/12	1,321	0	7,233	4,304	400	5,500
10/13	1,040	13	8,947	4,044	450	6,000
10/14	2,196	0	10,109	4,577	350	5,500
10/17	1,281	65	23,884	7,728	350	5,500
10/19	1,589	0	5,252	5,554	500	5,500
10/20	1,338	377	9,010	1,230	400	5,000
10/21	1,733	520	15,197	8,818	500	5,000
10/24	1,446	390	21,420	6,456	300	5,300
10/26	1,061	0	7,396	4,176	500	5,500
10/27	1,064	0	12,131	5,434	400	4,800
10/28	1,024	130	12,051	3,768	450	4,500
10/31	866	0	25,222	6,972	400	4,700
Avg.	1,796	269	12,758	4,724	422	5,122

APPENDIX C (continued).

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
11/1	227	0	13,179	2,795	400	5,500
11/2	424	0	13,549	5,602	650	5,500
11/4	1,946	0	29,580	5,280	650	5,000
11/7	995	0	12,845	2,742	900	5,500
11/8	832	0	9,154	3,076	700	5,500
11/9	2,319	0	6,064	2,624	600	4,800
11/10	2,338	0	3,551	4,518	1,600	5,000
11/11	1,739	390	6,404	6,420	1,800	5,500
11/14	2,630	130	7,913	12,456	700	5,600
11/15	1,526	0	5,291	6,734	1,000	5,500
11/16	1,332	0	2,709	3,984	2,100	5,800
11/17	3,132	235	3,747	6,292	900	5,000
11/18	2,750	195	6,231	10,496	800	5,900
11/21	3,309	247	12,369	10,661	450	5,200
11/22	1,170	0	7,115	7,144	500	5,300
11/24	896	10,092	20,646	0	900	4,800
11/25	393	0	14,751	4,190	500	5,300
11/28	529	0	10,213	5,514	700	5,500
11/29	65	0	6,329	2,898	1,300	5,500
11/30	168	0	5,978	4,816	1,000	5,500
Avg.	1,436	564	9,881	5,412	908	5,360

1988 Date	Number of Trays				Yen/Tray*	
	Japan	S. Korea	U.S.A.	Canada	Lowest	Highest
12/1	584	0	5,851	2,730	700	6,500
12/2	616	0	9,317	9,753	650	6,000
12/5	2,530	780	22,872	4,546	550	4,500
12/6	2,352	0	12,243	11,536	750	4,200
12/7	1,050	520	4,809	5,999	800	4,400
12/8	1,203	195	16,383	5,653	650	4,500
12/9	1,820	0	14,504	7,286	200	4,600
12/12	3,128	390	14,985	2,998	400	4,700
12/13	2,598	780	11,714	10,862	600	4,500
12/14	3,192	728	4,182	4,644	900	4,000
12/15	2,238	260	15,488	4,758	1,200	4,300
12/16	1,849	780	18,389	8,009	500	4,600
12/19	2,700	260	18,149	11,574	950	4,800
12/20	2,183	130	11,500	5,986	400	4,700
12/21	3,841	0	4,591	5,244	800	5,000
12/22	4,174	0	7,758	5,254	600	5,000
12/23	4,019	130	8,372	5,115	1,000	5,500
12/26	6,343	650	12,059	6,958	1,400	6,100
Avg.	2,579	311	11,843	6,606	725	4,883

* 225-260 g or 8-9 oz.

Source: The Nikkan-Shokuryo Shimbun.

Appendix D. List of U.S. sea urchin exporters

California

C & R Pacific Enterprises
P. O. Box 1533
Sebastopol, CA 95472
Tel: (707)875-2743
FAX: (707)875-2745

Int'l Marine Products
500 E. 7th Street
Los Angeles, CA 90014
Tel: (213)680-0497
FAX: (213)680-0317

California Uni
663 S. Fries
Gardena, CA 90744
Tel: (213)830-9226
FAX: (213)830-6695

Maruhide Marine Products
2142 West 17th Street
Long Beach, CA 90813
Tel: (213)435-6509
FAX: (213)432-4692

Catalina Offshore Products
4537 Mt. Henry Place
San Diego, CA 92117
Tel: (619)234-6939
FAX: (619)234-9108

Mendocino Fisheries
32330 N. Harbor Drive
Fort Bragg, CA 95437
Tel: (707)961-5426
FAX: (707)961-5428

Day Lee
2870 Lugo Street
Los Angeles, CA 90023
Tel: (213)802-6822
FAX: (213)296-0646

Meredith Fish
P.O. Box 954
Sacramento, CA 95804
Tel: (916)446-0251
FAX: (916)446-1917

East Ocean Co.
1260 West 2nd Street
Los Angeles, CA 90026
Tel: (213)977-0951
FAX: (213)977-0158

Natural Network Marketing
18603 N. Hwy 1, Suite 97
Fort Bragg, CA 95437
Tel: (707)964-1261
FAX: (707)964-1281

**Frontier Specialty
Prod. & Svcs Inc.**
10064 Mesa Ridge Court, #210
San Diego, CA 92121
Tel: (619)453-4488
FAX: (619)453-2173

Natural Sales Network
19290 S. Harbor Drive
Fort Bragg, CA 95437
Tel: (707)964-1261
FAX: (707)964-1281

Golden Gate Seafood
3588 Arden Road
Hayward, CA 94545
Tel: (415)732-0975
FAX: (415)732-0977

**Ocean Fresh Seafood
Products, Inc.**
780-A North Harbor Drive
Fort Bragg, CA 95437
Tel: (707)964-2023
FAX: (707)964-8177

Ocean Queen

1300 East 1st Street
Los Angeles, CA 90033
Tel: (213)261-5921
FAX: (213)261-6867

Pacific Marine Product

398 South Kalorama Street
Ventura, CA 93001
Tel: (805)648-3261
FAX: (805)648-7148

Pemberton Fish

P. O. Box 245
El Granada, CA 94018
Tel: (415)728-7334

S/M Uni Service

728 Ceres Avenue
Los Angeles, CA 90021
Tel: (213)626-2557

San Francisco Uni Products

1709 East Colon
Wilmington, CA 90744
Tel: (213)549-0274
FAX: (213)549-0623
32100 N. Harbor Drive
Fort Bragg, CA 95437
Tel: (707)961-1413
FAX: (707)961-1442

Tidal Wave Seafood

5115 Corbina Way
Oxnard, CA 93035
Tel: (805)985-0964
FAX: (805)984-9672

Maine**BSA Group**

P.O. Box 181187
Cathedral Station
Boston, MA 02118-1187
Tel: (617)695-0880
FAX: (617)695-9311

Oregon**Bongourmet**

7014 NE 79th Ct
Portland, OR 97218
Tel: (503)257-1111
FAX: (503)257-1113

Premium Pacific Seafood

P. O. Box 2
Port Orford, OR 97465
Tel: (503)332-5255
FAX: (503)332-6705

Rogue Seafood

P. O. Box 154
Gold Beach, OR 97444
Tel: (503)247-4554
FAX: (503)247-7222

Washington**Far East Seafood**

2202 Center Street
Tacoma, WA 98409
Tel: (206)627-7003
FAX: (206)627-7208

O.J. Fish Company

1224 46th Avenue E.
Fife, WA 98424
Tel: (206)922-9171
FAX: (206)922-9096

Orient Seafoods Production

2414 East "F" Street
Tacoma, WA 98421
Tel: (206)272-4472
FAX: (206)627-6703

Pacific Seafoods

P. O. Box 2150
Port Angeles, WA 98362
Tel: (206)457-1440
FAX: (206)452-4677

Trans-Ocean Enterprise
18942 Des Moines Way
Seattle, WA 98418
P.O. Box 70628
Seattle, WA 98107
Tel: (206)242-9469

Sources: California Department of Fish & Game.
Oregon Department of Fish and Wildlife.
Washington Department of Fishery.
NMFS, Southwest Region Seafood Dealers Guide.

Appendix E . List of Japan's sea urchin importers

Aic Inc.

4, 2-chome, Kanda Jimbocho
Chiyoda-ku, Tokyo 101
Contact: Mr. Ishi
Phone: 03-230-2884
FAX: 03-238-0574
Telex: 2325034
Comment: Importer for
supermarkets

The Daiei, Inc.

Hamamatsucho Office Center
2-4-1, Shibakoen
Minato-Ku, Tokyo 105
Contact: Hiroyuki Kida
Phone: 3-433-9154
FAX: 03-433-9552
Telex: 2428314
Comment: Supermarket chain

Asahi Bussan Co., Ltd.

7th Fl., Tokyu Ginza Bldg.,
15-2, Ginza 2-chome
Chuo-ku, Tokyo
Contact: G. Masuyama
Tel: 03-542-4141

Daiichi Suisan

5-2-1 Tsukiji
Chuo-ku, Tokyo 104
Contact: Takeo Furuya
Phone: 03-541-6589
FAX: 03-541-1466
Telex: NA
Comment: Importer,
auction house

Ataka Produce Co., Ltd.

Y-Bldg., 13-2, Shibaura 3-chome
Minato-ku, Tokyo 108
Contact: NA
Phone: 03-798-0641
FAX: 078-798-0845
Telex: NA
Comment: Importer
(whole sea urchins)

Daiyu Co., Ltd.

Tokiwamatsu Aoi Bldg.,
3-17, Shibuya 4-chome,
Shibuya-ku, Tokyo
Contact: Mr. Higuchi
Tel: 03-406-1666

Beverly Trading Co.

2-3-202 Kamoike Shinmachi
Kagoshima-shi, Kagoshima 890
Contact: NA
Phone: 0992-53-4186
FAX: NA
Telex: NA
Comment: Importer

Fujisawa Office

124, Kojo 1-chome,
Karayamazuchou
Kaga-shi, Ishikawa-ken 922-04
Contact: Kyoen Fujisawa
Phone: 07617-4-7577
FAX: 07617-4-7282
Telex: NA
Comment: Importer
(whole sea urchins)

C. Itoh & Co., Ltd.

4-68, Kita Kyutaro-machi,
Higashi-ku, Osaka
Contact: Mr. Matsumoto
Tel: 06-241-3862

Holley Trading Co.

1-33-7-105, Narita-Higashi
Suginami-ku, Tokyo 166
Contact: Robert Holley
Phone: 03-318-9333
FAX: 03-318-9333
Telex: NA
Comment: Importer
(whole sea urchins)

Hosho Trading Inc.
Kyodo Bldg. Ginza 3-chome
10-9, Ginza 3-chome
Chuo-ku, Tokyo 104
Contact: Jerry Y. Iwasa
Phone: 03-543-7201
FAX: 03-545-5833
Telex: 23803
Comment: Importer

Inoue Foods Co.
2-4-1 Fujimi
Urayasu-shi, Chiba
Contact: Mr. Inoue
Phone: 0473-52-0035
FAX: 0473-51-0835
Telex: NA
Comment: Processor

International Corporation
1-22-20 Shimanouchi, Minami-ku
Osaka-shi, Osaka
Contact: Ms. Komoriya
Phone: 06-244-1828
FAX: 06-281-1150
Telex: NA
Comment: Importer
(whole sea urchins,
frozen sea urchin roe)

Iwate Trading Co., Ltd. 2-10-3,
Minami-Odori
Morioka, Iwate 020
Contact: Masakichi Takahashi
Phone: 0196-61-2003
FAX: NA
Telex: 832517
Comment: Importer

Kowa Corporation
Yashima Bldg.
1-1, 3-chome, Shinbashi
Minato-ku, Tokyo
Contact: Shojiro Ichimaru
Phone: 03-501-8801
FAX: NA
Telex: 22608
Comment: Importer

Kyodo Trading Col, Ltd.
Shin Tanimachi #3 Bldg.,
7-12-1, Tanimachi,
Minami-ku, Osaka
Contact: Mr. Horiya
Tel: 06-768-4410

Maruto Co.
Kakuman Hayashi Bldg.
Nishi 19, Kita 8, Chuo-ku
Sapporo, Hokkaido 060
Contact: Ken Ishii
Phone: 011-644-9202
FAX: 011-644-9202
Telex: 0932388
Comment: Importer

Matsukawa Suisan
12-46 Ohsawagashira,
Shirogane-cho
Hachinohe-shi, Aomori 031
Contact: Toyosaku Matsukawa
Phone: 0178-34-5555
FAX: 0178-34-5585
Telex: NA
Comment: Importer
(whole sea urchins)

Miyata Trading Corp.
Koishikawa Bldg.
5-10, 4-chome, Tsukiji
Chuo-ku, Tokyo
Contact: Toru Yaegaki
Phone: 03-545-8511
FAX: NA
Telex: NA
Comment: Importer

Nichia Koeki Co., Ltd.
No. 6 Kakiuchi Bldg.
18-4, 1-chome Higashi-Gotanda
Shinagawa-ku Tokyo
Contact: T. Goto
Phone: 03-447-3661
FAX: 03-447-1886
Telex: 2468386
Comment: Importer

Nichibo Japan Trading Co., Ltd
P.O. Box 55
Ise, Mie Pref. 516
Contact: Hitoshi Sakaguchi
Phone: 0596-22-3011
FAX: 0596-22-3956
Telex: NA
Comment: Importer, wholesaler

Nichibu, Ltd.
Iiikuradai Bldg.
1-9-12 Azabudai
Minato-ku, Tokyo 106
Contact: Toshikuni Sudo
Phone: 03-583-5341
FAX: 03-583-5359
Telex: NA
Comment: Importer

Nichimo Co., Ltd.
Nippon Bldg., 6-2, 2-chome,
Ohtemachi, Chiyoda-ku, Tokyo,
Contact: Commodities Supply
Dept.
Tel: 03-245-4895

Nihon Hogeï Co., Ltd.
Iino Bldg., 1-1,
Uchisaiwai-cho, 2-chome,
Chiyoda-ku, Tokyo 100
Contact: Mr. Kikuchi
Tel: 03-506-5380

Nippon Reizo Co., Ltd.
3-23, Misakicho 3-chome,
Chiyoda-ku, Tokyo
Contact: Mr. H. Matsubara
Tel: 03-237-2222

Nisshin International Corp.
3 Fl., Nagai Bldg., 9-7,
Tsukiji 3-chome,
Chuo-ku, Tokyo
Contact: Mr. Okamura
Tel: 03-542-3628

Nozaki & Co., Ltd.
Marine Prod. A Team
7-16-19 Ginza
Chuo-ku, Tokyo 104-91
Contact: Kazuhiro Yamaguchi
Phone: 03-541-9221
FAX: 03-238-0574
Telex: NA
Comment: Importer; whole/
processed sea urchins

Ogawa Shoten Co.
89-5 Irie
Abuta-cho, Hokkaido 049-56
Contact: Teiji-ro Ogawa
Phone: 01427-6-2323
FAX: 01427-6-4277
Telex: NA
Comment: Processor

Seiwa Trading Co., Ltd.
Tsukishima-Heights Rm. 215,
21, 4-chome, Tsukishima,
Chuo-ku, Tokyo
Contact: Mr. T. Tagami
Tel: 03-533-5881/2

Shoei Pack
Nakanishi Bldg.
11-8 Nihonbashi-Kofunecho
Chuo-ku, Tokyo
Contact: Hirosuke Matsui
Phone: 03-664-4181
FAX: 03-664-4188
Telex: NA
Comment: Importer; (processed
sea urchins)

Suzuki Shoten Co., Ltd.
101-102, Edocho, Chuo-ku
Kobe-shi, Hyogo Pref.
Contact: Mistsuo Kadota
Phone: 078-321-5510
FAX: 078-331-1190
Telex: NA
Comment: Importer, wholesaler

Takasago
2-10-11 Nihonbashi
Chuo-ku, Tokyo
Contact: Mr. Shigemori
Phone: 03-271-1466
FAX: 03-278-8400
Telex: NA
Comment: Importer

Udo Co., Ltd
Central Higashi Ginza 1207
2-15-15 Tsukiji
Chuo-ku, Tokyo 104
Contact: Atsushi Udo
Phone: 03-545-3851
FAX: 03-546-0188
Telex: NA
Comment: Importer; processed
sea urchins

Takuyo Corporation
Kyohei Bldg., 1-6-1,
Hatchobori, Chuo-ku, Tokyo
Contact: Mr. Shimada
Tel: 03-553-3261

Uriku Suisan LTD.
Matsubara 2-223 Ishinomaki,
Miyagi

Torin Trading Co.
21-75, Junibayashi, Kanaya
Mutsu 035
Contact: Shigeru Futatsumori
Phone: 0175-22-6336
FAX: 0175-22-6337
Telex: NA
Comment: Importer; (processed
sea urchins)

Sources: U.S. Embassy, Tokyo, Japan.
Embassy of Chile, Tokyo, Japan.
Instituto Nacional de Pesca, Mexico